

**THE EFFECTS OF EGO AND EXTERNAL STRESS ON GROUP
COOPERATION**

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by

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THE EFFECTS OF EGO AND EXTERNAL STRESS ON GROUP COOPERATION

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Dedicated to My Parents and My Husband

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SUMMARY

I conduct two experiments to examine the effects of different types of stress on individuals' willingness to cooperate. The experience of stress is characterized by the primary cognitive appraisal of threat. It activates the emotion of anxiety and induces stress coping behaviors. I posit that because different types of stress differ in terms of the secondary dimension of cognitive appraisal, the responsibility of possible failure, they lead to different stress coping behaviors in collaborative contexts. Based on the attribution of threat, I classify stress into two types, ego and external stress. Under ego stress, the possible failure is attributed to one's capabilities. Ego stressors, such as lack of skill, cause individuals to worry about their capabilities, posing a threat to goal achievement. I argue that ego stress motivates an individual to seek affiliations for joint protection. I provide experimental evidence that ego stress increases cooperation. Under external stress, on the other hand, the possible failure is attributed to factors in the environment. External stressors, such as environmental uncertainty, cause individuals to worry about threat related factors in the environment, which also may hinder goal achievement. I argue that external stress motivates people to avoid risks, including the risk of being exploited by a partner. I provide evidence that external stress reduces cooperation.

CHAPTER 1

INTRODUCTION

The success of work teams in organizations is determined by the cooperation of team members (Tyler and Blader 2000; Young et al. 1993). Many studies have investigated methods of promoting cooperation from formal and informal control perspectives (e.g., Alchian and Demsetz 1972; Arya et al. 1997; Coletti et al. 2005; Itoh 1991; Ramakrishnan and Thakor 1991; Rankin 2004; Rankin and Sayre 2000; Rowe 2004; Tayler and Bloomfield 2011). From a formal control perspective, to establish or maintain cooperation using economic incentives requires that companies obtain information on individuals' contributions (Towry 2003). However, acquiring such information is often too costly. Therefore, researchers began to investigate informal control mechanisms, which rely on employees' social motives such as trust (Coletti et al. 2005) and norm compliance (Tayler and Bloomfield 2011). Along these lines, social psychology research suggests stress (i.e., a threatening or noxious psychological and physiological state) may influence cooperation (Lazarus 1993). Therefore, such an effect may be a potential informal control mechanism.

It is important to examine the effect of stress in a collaborative context because stress is pervasive, with 83 percent of employed adults in the United States affected by it (Interactive 2013). In the workplace, stress is induced by various personal, task, and environmental factors, or stressors. The objective of this study is to investigate the effect of stressors on cooperation. Specifically, I classify stressors into two types and propose that they influence cooperation differently.

According to social psychology research, the evaluative thoughts of situations, or cognitive appraisals, dictate the emotional experience and coping behaviors (Lazarus 1993). Stressful situations are characterized by the primary cognitive appraisal of threat, which activates the emotion of anxiety. Anxiety is an aversive emotional state characterized by agitation, tension, and trouble in mind (Tyrer 1999). It is caused by the threat to a current goal (i.e., the source of anxiety) (Epstein 1973). In order to achieve the goal, anxiety motivates individuals to develop compensating strategies (or stress coping behaviors) to reduce the threat (for a review, see Eysenck 1992). Moreover, the motivating effect of anxiety spills over to tasks that are incidental to the source of the anxiety, and increases the use of compensating strategies in these tasks (Forgas 1995; Raghunathan and Pham 1999). In this study, I argue that factors in the workplace induce anxiety, which increases the use of compensating strategies in collaborative contexts. The compensating strategy in such contexts remains unknown: the stress coping literature provides conflicting arguments in terms of the effect of stress on cooperation.

I further argue that the specific stress coping behavior (i.e., to cooperate or not to cooperate) is dictated by a secondary cognitive appraisal, the responsibility of possible failure. Specifically, the threat of failure to achieve a goal may be attributed to one's own capability or to threat-related factors in the environment. Based on such differences, I classify stressors into two types, ego and external stressors. For ego stressors, the threat of failure of achieving one's goal is attributed to individuals' inability to meet task demands. Examples of ego stressor are skill deficiency and performance feedback. For external stressors, the threat of failure is attributed to threat related external factors in the environment. Examples of external stressors are uncertainty in the business environment

or within organizations. These stressors cause individuals to worry about threat related factors in the environment that may negatively impact one's goal achievement.

I posit that different types of stressors lead to different choices of coping options. As defined, ego stress causes individuals to worry about their own capability. I expect that in situations with high levels of ego stress, the feeling of lack of personal competence motivates individuals to seek help and protection, which can be obtained via affiliation. As a result, an individual is more willing to cooperate when the level of ego stress is high than when it is low. As defined, external stress causes an individual to worry about external factors. It motivates individuals to reduce the threat related factors and avoid exposure to relational risk. As a result, individuals are less willing to cooperate when the level of external stress is high than when it is low.

I conduct two experiments on Amazon Mechanical Turk (MTurk) to investigate the effect of ego and external stressors on cooperation, respectively. Both studies have a 1×2 between-participant design, in which I manipulate the level of stress (high and low). To operationalize the independent variable, participants complete a directed-writing task, in which they describe a stressful (or not stressful) experience in their life. To operationalize the dependent variable of cooperation, participants are randomly paired to play a Prisoner's Dilemma game with monetary incentives, immediately following the completion of the directed-writing task. Specifically, in experiment one, I manipulate the high (low) level of ego stress by requiring people to write about their weaknesses (strengths) in terms of skills that they are most worried (content) about. I find that participants in the high ego stress condition are more cooperative than participants in the low ego stress condition. In experiment two, I manipulate the high (low) level of external

stress by requiring participants to write about situations that they feel the most uncertain (certain) in their life. I find that participants in the high external stress condition are less cooperative than those in the low external stress condition.

My study makes a few contributions to the literature. First, my study extends the psychology literature by examining the effect of stress on group cooperation. The stress literature identifies two categories of stress coping behaviors, fight-or-flight and tend-and-befriend. The former suggests that stress increases risk avoidant behaviors, which hints that stress may reduce individuals' willingness to undertake relational risk, and as a result, decrease cooperation. The latter suggests that stress may enhance the need for affiliations, and therefore, increase cooperation. I reconcile these conflicting predictions by classifying stressors into two categories: ego and external stressors. I provide evidence that they influence cooperation differently. Specifically, ego stressors are factors that cause individuals to worry about their own capabilities. They increase cooperation by motivating an individual to seek affiliations for joint protection. External stressors are factors that cause individuals to worry about threat related factors in the environment. They reduce cooperation by motivating people to avoid relational risks.

Second, by identifying unique motives of cooperation, this study helps management accountants understand antecedences of cooperative behaviors in the workplace. In the management accounting literature, previous studies have examined many economic and social motives of cooperation. Unlike these studies, my dissertation introduces another category of factors, emotion, which influences cooperation. Specifically, stress affects cooperation due to unconscious motivating mechanism, in which individuals engage in certain behaviors because such behaviors make decision

makers feel better. Understanding such motives provides researchers and practitioners a better understanding of antecedences of cooperation in work teams.

Third, my studies suggest that stress constitute an additional informal control mechanism. Based on the results of my study, it may be inferred that contextual factors and management accounting tools influence cooperation due to the induced stress. Previous studies in the management literature identified many stressors in the workplace (e.g., Murphy 1995). In this paper, I review and discuss these stressors in the context of management accounting. I also provide theories to classify these stressors and predict their influences on cooperation. This study extends the literature that investigates the effect of personal, task and environmental variables on incentive mechanisms in management accounting (Bonner and Sprinkle 2002). These effects are informal control mechanisms in the workplace.

Fourth, this research has practical implications for designing control systems in organizations. Companies make tradeoffs between the cost of investing in formal control mechanism and the cost of low productivity as a result of free-riding. By understanding the effects of situational factors on cooperation, organizations may identify situations in which the rate of free-riding is relatively high or low. The control systems may be designed accordingly. The strength of formal control system needs to be higher in situations with high free-riding rate than in situations with low free-riding rate. For example, in accounting teams, where tasks are relatively difficult (high ego stress) and the environment is not very turbulent (low external stress), cooperation levels can be relatively high even without formal control mechanisms. In contrast, in sales teams, where tasks are relatively easy (low ego stress) and performance is highly influenced by

market conditions (high external stress), cooperation levels may be relatively low without formal control mechanisms. In such cases, to promote cooperation, companies may need to incur costs to acquire information regarding individuals' effort level. With such information, companies can use formal control to increase cooperation.

The remainder of this dissertation is organized as follows. In Chapter II, I discuss prior literature. In Chapter III, I provide theoretical background and develop my research hypotheses. In Chapter VI, I report the pretest results of my research instrument. In Chapter V, I describe the research method and results of experiment one, used to test hypothesis 1. In Chapter VI, I report the research method and results of experiment two, used to test hypothesis 2. In Chapter VII, I offer concluding remarks.

CHAPTER 2

LITERATURE REVIEW

2.1 Cooperation in a Collaborative Context

In a collaborative context, motivating employees to exert effort, or to cooperate, is an important issue in the incentive contracting literature of management accounting (Sprinkle 2003). In collaborative contexts, individual contributions cannot be easily identified; therefore, individuals are usually compensated based on the output of team production. As a result, such contracts do not provide an economic incentive for agents to exert effort, but instead cause the free-rider problem (Holmstrom 1982). The opposite of taking a free ride is cooperation, which means that all team members exert effort toward a group goal. Below, I briefly discuss theories and evidence related to the willingness to cooperate from the perspectives of economic motives, social motives and emotion.

2. 1.1 Economic Incentive

The cause of the free-rider problem is the lack of economic incentives for agents to exert effort in the collaborative context. In this section, I first explain game theory models and experimental evidence, which identify the free-rider problem. I then discuss formal control mechanisms which aim to improve cooperation from the economic perspective.

Game theory sheds light on the incentive issue in group incentive contracts. The conflict of interests in such contexts is captured by both the Prisoners' Dilemma game and the Public Goods game. In both games, each agent knows that the payoff will be the

highest for him/herself if everyone else works, but he or she chooses to shirk.

Accordingly, the Nash Equilibrium for both games is for all players to choose low effort/contribution level.¹ In such contexts, the probability that an individual will shirk is termed relational risk. For an individual, such risk is originated from other people's behavior and is unique to the collaboration context (e.g., Das and Teng 1996, 1999, 2001). Therefore, it is different from other types of economic risk, which is determined by the realization of a random event. Based on the game theoretic prediction, the relational risk is extremely high (i.e., individuals chose to shirk with 100% probability). Below, I discuss different variations of the game, including the one-shot interaction, infinitely repeated interaction and the finitely repeated interaction. I briefly review both theoretical predictions and experimental evidence.

In one-shot public good experiments, the results partially support the free rider problem. Marwell and Ames (1981) conducted an experiment with different group sizes, for different monetary stakes, for participants playing the game for the first time, and after a previous experiment. On average, participants contribute 40 to 60 percent of their stake to the public good. This experiment has been replicated by other researchers (e.g., Andreoni and Miller 1993). Such results demonstrate that some people get a "free ride" while others do not. Therefore, although the free-riding issue is not as problematic as theoretically predicted, a considerable portion of participants do take a free-ride.

Repeated interaction has the potential to improve cooperation under some circumstances, but does not solve the cooperation issue entirely. The effects differ

¹ The difference between two games is that while PD games usually involve two players, the Public Goods Game usually involves multiple players.

between infinitely and finitely repeated interactions. For infinitely repeated games, theoretical equilibria can be reached that each agent exerts high effort all the time, when certain strategies are used. For example, in an infinitely repeated Prisoner's Dilemma, players may use the Grim Trigger Strategy, in which a player cooperates until the other defects and then the player defects forever (Axelrod 1984). This strategy yields Nash Equilibrium in which both players cooperate forever if players do not discount the future too much. As another example, in the strategy of Tit for Tat, a player will first cooperate, then subsequently replicate an opponent's previous action. Any person who adopts such strategy is expected to receive higher payoffs than those who do not adopt it (Axelrod 1984).

Experimental studies simulated infinite interaction with random continuation rules and provide evidence that partially supports the prediction that infinitely repeated interaction increases cooperation. For example, Palfrey and Rosenthal (1994) compared a one-shot game with infinitely repeated games with a probability of continuation of 0.9 and found that the latter leads to more cooperation than the former. The percentage of contribution increased from 29 to 40 percent. Dal Bo (2005) provides evidence that the greater the probabilities of future interaction, the more likely participants choose to cooperate. Above all, empirical evidence partially supports the theoretical argument that infinitely repeated interaction improves cooperation.² However, in practice infinite

² Perfect cooperation in every period is never reached in the laboratory, which could be attributable to methodological issues of the continuation rule. According to this rule, participants can calculate an expected number of rounds in the experiment instead of considering the game to be infinite. Therefore, punishments are not credible and the future casts no shadow.

interaction is not possible. A more common scenario is finite interaction with the opportunity of reputation building.

With regard to finitely repeated games, theoretically if a stage game has a unique Nash equilibrium, then the repeated game has a unique sub-game perfect outcome: the defection equilibrium (i.e., each player defects in the game) will be played in every stage as a result of backward induction. Several experiments showed that cooperation declines sharply after a few repetitions in a finite repeated Prisoner's Dilemma (Kim and Walker 1984; Isaac et al. 1984; Isaac et al. 1985).³ In these games, reputation building or signaling has the potential of improving cooperation. That is to say, a participant can take cooperative actions repetitively to build a reputation as someone who always cooperates. If the opponent understands and coordinates, a cooperative equilibrium may be reached.⁴ The reputation building argument is supported by experimental evidence (Andreoni and Miller 1993; Bolton et al. 2005). For example, Bolton et al. (2005) showed that even with high costs, providing information about a partner's immediate past action increases cooperation. Recursive reputation information of previous partners further promotes cooperation, regardless of the cost of cooperation.

³ One leading theoretical explanation is that cooperation in finitely repeated Prisoner's Dilemma games arises due to the presence of incomplete information regarding the utility function of a rival (Kreps et al. 1982). The power of the study—that a small belief that an opponent will cooperate—is enough to support considerable cooperative play even when all players are purely self-interested.

⁴ In order for this to work, however, players must believe that in the beginning of the game, the other player is likely to behave in this way. Another requirement for the signal to operate is that players have some incentive to signal. Signaling is undertaken only with a substantial cost: both immediate cost and strategic cost. The immediate cost is the failure to make a play that represents an optimal response to an opponent's expected actions in the next few periods. Strategic cost may arise if the opponent's long run response to the signal is adverse. The last requirement for signaling and reputation building is that players must be willing to probe their opponents to learn about the strategies they are playing. For example, in order for a player to establish a reputation for using a "Tit For Tat" strategy, her opponent must be willing to investigate this possibility by playing cooperatively for at least a few periods. If an opponent adopts a "Grim Strategy," signaling will not work (Watson 1996).

Above all, both theory and experimental evidence suggests that the free-rider issue cannot be eliminated in various types of agent interactions. Therefore, many management accounting researchers seek to investigate the effectiveness of various control systems in improving cooperation in collaborative contexts. The most traditional form of control mechanism is the formal control of monitoring. I discuss a few economic models of monitoring below.

The first control system in the literature is investigated by Alchian and Demsetz (1972), who argue that the individual who monitors team member's inputs should be the residual claimant. This ensures incentive compatibility of monitors because the monitoring activity itself is non-contractible. However, monitoring by a principal or specialist can be very costly or even impossible. In fact, if principals could obtain contractible information as to agents' effort levels, they are better off contracting on individual effort and contribution because of the risk-averse nature of agents.

The second approach is the mutual monitoring among agents. Holmstrom (1982) demonstrates that efficient or near-efficient outcomes may be achieved by making team members residual claimants on the effects of their actions, while not conferring ownership rights on them. Groups of workers often have much better information about their individual contributions than the employer is able to gather. Group incentives then motivate the employees to monitor one another and to encourage effort provision or other appropriate behavior. That is to say, peer monitoring can help the principal to extract private information and, at the same time, save the cost of supervisory or third party monitoring (Milgrom and Roberts 1992).

Researchers investigated two forms of peer monitoring: vertical monitoring and horizontal monitoring. The former relies on vertical communication from agent to principal, the latter relies on team self-management. For vertical monitoring, each agent observes the other agent's action and reports to the principal. Each agent's payoff is based on reports filed by other group members. The effectiveness of such monitoring mechanism depends on whether agents will choose strategies independently, because coordination among them can undermine the reliability of their reports. Itoh (1993) proved that due to collusion there exists no revelation mechanism which improves the principal's welfare. Another form of peer monitoring is horizontal monitoring, which relies on team self-management and peer-based control. In contrast to the vertical approach, the horizontal monitoring system induces agents to agree to take actions desired by the principal. Such agreement is implemented either explicitly or implicitly through formal sanctions, peer pressure, or enforceable side contracting (Itoh 1993; Arya et al. 1997; Che and Yoo 2001; Gibbons and Murphy 1992). However, the horizontal monitoring system requires that agents have access to ex post perfect information, which is impractical. To sum up, due to information asymmetry, neither vertical nor horizontal monitoring mechanism can successfully and practically be implemented to solve the cooperation problem completely.

2.1.2 Social Motives

Besides economic motives explained above, many social motives also influence people's cooperative behavior. Researchers have investigated the implication of these motives and identified mechanisms that enhance cooperation because of individuals' social motives. In this section, I discuss these social motives and then review studies

which show that contextual factors influence cooperation due to employees' social motives.

Cooperation is influenced by many social motives, including altruism, reciprocity, trust, norm compliance and ethical and fairness concerns. In the experimental economics literature, altruism and reciprocity are first used to explain why people cooperate.

Altruism means that people are motivated by taking pleasure in others' pleasure or by "doing the right thing," which means the satisfaction of conscience or ethical mandates (Anderoni 1995; Anderoni and Miller 1993; Cooper et al. 1996). Many experiments reveal that a considerable portion of people understands the free-riding problem, but choose to engage in cooperation behavior due some form of kindness (Anderoni 1995). Such behaviors are also observed when reputation building is controlled (Anderoni and Miller 1993; Cooper et al. 1996).

With respect to reciprocity, researchers have identified two types: weak and strong reciprocity. Weak reciprocity is the cooperative behavior in accordance with self-interest rule. Weak reciprocity includes strategic reputation building behavior and best response cooperative behavior, which was discussed in the previous section. Strong reciprocity is the willingness to cooperate with others and punish non-cooperators, even when such behavior cannot be justified in terms of self-interest (Gintis 2000; Carpenter et al. 2009). One form of strong reciprocity is the behavior in response to generosity. This has been discussed extensively in the gift exchange literature (e.g., Berg et al. 1995). This literature has shown that generous behavior often induces reciprocal responses. Recipients of a gift frequently respond by being generous to those who give the gift. While such behavior is rational in a repeated setting of efficient wage theory, results in a

single shot game lend strong support to the argument of strong reciprocity (Fehr et al. 1996). Another form of strong reciprocity is the behavior to punish unfair behavior, which is observed in numerous ultimatum game experiments (e.g., Guth and Tietz 1990; Roth 1995; Camerer and Thaler 1995). The results of these experiments suggest that people are frequently willing to forego some money in order to punish unfair behavior.

Another construct that helps understand cooperation is trust. In most definitions, trust is the immediate precursor of risk taking behavior or the psychological state before risk taking behavior. Trust involves two important components: positive expectations of the intentions of behavior of another individual (Lewicki and Bunker 1996) and the willingness to be vulnerable (Mayer et al. 1995). Positive expectations of the intentions of behavior of another individual are related to trustors' perceptions about the motives underlying trustees' behavior (Smith and Barclay 1997). Positive perceptions cause trustors to believe that they will receive good treatments, leading to a willingness to engage in cooperative behaviors (Gambetta 1988; Kramer et al. 1996). With regard to willingness to be vulnerable, inherent in it is the relational risk, which is one condition considered essential in psychological sociological and economic conceptualizations of trust (Coleman 1990; Rotter 1967; Williamson 1993). For example, Rousseau et al. (1998) describes a reciprocal relationship between trust and risk taking: risk creates an opportunity for trust, which leads to risk taking.

Cooperation is also affected by other factors, such as team identity (Rowe 2004), histories and norms (Nalbantian and Schotter 1997; Taylor and Bloomfield 2011), ethical concerns (Salterio and Webb 2006), and perceived fairness (Zhang 2008). Besides their direct affects, some of these factors may impact cooperation indirectly by influencing

trust and/or reciprocity. For example, team identity and social norm affect cooperation by changing trust, which in turn influences cooperation. As another example, perceived fairness is the motive for negative reciprocity, which changes willingness to cooperate by changing the utility of choosing to cooperate.

Due to the strong influence of these factors on cooperation, many researchers seek to account for such effects in the design of control systems. They have identified situational variables, which influence cooperation due to social motives. First of all, beyond its economic effects, the formal control mechanism impacts cooperation because it influences trust and norms compliance. In terms of the relationship between formal control and trust, some scholars argue that this relationship is substitutionary (i.e., control decreases trust), while others argue that it is complementary (i.e., control enhances trust). Proponents of the substitutionary relationship argue that the control system signals distrust because of the incompatibility between control and positive expectations about the intentions of another party. A large body of research indicates that the implementation of formal controls serves as a signal of mistrust on the part of the controlling party (e.g., Curral and Judge 1995; Falk and Kosfeld 2006; Das and Teng 1998; Malhotra and Murnighan 2002). Moreover, according to attribution theory, when a collaborator cooperates, other collaborators may attribute the cooperation either to the person's innate trustworthiness (a dispositional characteristic) or to the fact that there is a control system in place (a situational characteristic). Malhotra and Murnighan (2002) find that cooperation in the presence of a control system is attributed, at least partially, to the constraints imposed by the control system. Therefore, control systems inhibit the development of trust.

The complementary point of view, on the other hand, argues that trust and control can be mutually reinforcing and contribute to the level of cooperation needed in a relationship (Sitkin 1995; Zucker 1986). For example, Coletti et al. (2005) provide evidence that a strong control system can enhance the level of trust among collaborators. This increased trust, in turn, has a positive effect on the subsequent level of cooperation among collaborators. This finding suggests that control induced cooperation engenders trust and generates an increasing marginal benefit of the control system.

Formal controls also influence norm compliance and affect cooperation. Taylor and Bloomfield (2011) provide evidence that formal controls affect cooperation due to a direct influence on personal norms and an indirect influence on descriptive norms. This study takes a dynamic approach and documents that norm compliance effects persist even after the controls are changed, so that cooperative behavior can be strongly influenced by past control strength.

Besides the control system, various institutional factors also influences social motives of cooperation. These factors include task interdependence, accounting structure, and team design. Task interdependence may influence cooperation in both directions. On the one hand, high task interdependence implies low identifiability of individual effort, which decreases cooperation (e.g., Harkins and Petty 1982; Weldon and Gargano 1988; Williams et al. 1981). On the other hand, it implies high mutual observability of agents' effort, which increases cooperation (Liden et al. 2004). As another example, accounting report structure, which creates a "group frame," is demonstrated to complement team structure and to mitigate the free-rider problem (Rowe 2004). Lastly, cooperation is also influenced by team identity (Towry 2003). High level

of team identity shift individuals' attention to joint rather than individual outcomes (Brewer 1979). Team members who share high team identity believe that outcomes can be influenced by collective rather than individuals actions. Therefore, they will coordinate their actions.

2.1.3 Emotion

Most of the previously reviewed studies take the cognitive approach, also called the consequentialist approach. Specifically, economic models assume that people choose different courses of action based on the desirability of their consequences or "utility." Behavioral decision research that incorporates social motives have generally adhered to the consequentialist perspective, but modify assumptions about sources of utility, weighting, time discounting or the form of the utility function. However, in recent years, many studies point out that emotion plays a significant role in decision making in the field of social psychology (e.g., Epstein 1994; Wilson et al. 2000) and decision science (e.g., Slovic et al. 2002; Peters and Slovic 2000; Loewenstein et al. 2001; Lerner and Keltner 2000, 2001). Specifically, decision making may follow an alternative process, which is simple, reactive and fast (Metcalf and Mischel 1999). This type of decision process is called an affective or automatic process. In contrast, the consequentialist approach is called the deliberative and controlled process, which is complex, reflective and slow.

In terms of the influence of affect on individuals' decision making in social contexts, most studies in the current literature used paper and pencil tasks to elicit individuals' willingness to act pro-socially in hypothetical scenarios. The early research dichotomizes the affective experience in terms of its valence (positive or negative) and

documents that positive affect increases pro-social behaviors, such as helping (e.g., Carlson et al. 1988; George 1991). The effects may be driven by various mechanisms, including a change of attentional focus, an increase of self-awareness, use of an alternative decision process, an amelioration of social outlook, a need to maintain positive mood or concomitant factors. Later studies investigate specific emotions and find that various emotions which have the same valence influence cooperation differently. As an example, Dunn and Schweitzer (2005) suggest that emotions of happy, gratitude and anger influence trust. By comparison, the same study suggests emotions of pride, guilt and sadness do not influence trust because the appraisal of these emotions is not consistent with the judgment task. The theory behind such phenomenon is that emotions are misattributed to the target being evaluated. Emotions are more likely to be misattributed when the appraisals of the emotion are consistent with the judgment task than when the appraisals of the emotion are inconsistent with the judgment task.

Recent evidence in the social psychology literature hints that cooperation may be influenced by stress. Because stress is induced by many factors in the workplace, I seek to investigate the relationship between stressors and cooperation. In the next section, I describe various stressors in the workplace.

2.2 Stress and Management Accounting

Stress is disturbance to one's psychological and physiological equilibrium (Kobell 1995). It arises when an individual's perceived ability is inadequate for the demand of a task. Although perception of a situation may differ across individuals due to differences in personal attributes, characteristics of the workplace contribute to the stress experience (Colligan and Higgins 2005). Workers are especially prone to experience stress in what is

called a toxic work environment. Toxic workplaces are characterized by “relentless demands, extreme pressure, and brutal ruthlessness (Macklem 2005).” This type of workplace often involves high work demands and over-controlling/harassing environments (Karasek and Theorell 1990; Mausner-Dorsch and Eaton 2000). Murphy (1995) describes five categories of factors that contribute to stress in the workplace: (1) factors unique to the job, (2) role in the organization, (3) career development, (4) interpersonal work relationships and (5) organizational structure/climate. Many factors within these five categories are determined by management accounting practice or are important in the context of management accounting practice. I discuss factors in these categories and their relations to management accounting practice in detail.

The first category is “factors unique to the job.” This category includes workload, work hours, work pace, physical environment and autonomy of workers, isolation from other workers and the meaningfulness of job (Murphy, 1995). For example, Kantowitz (1987) describes a multidimensional model indicating that stress is influenced by a combination of work demands (task number, type, difficulty and contextual factors) as well as individual factors (coping capacity, willingness to expend effort, values, motives and strategies).

Workload may be classified into quantitative overload and qualitative overload. The former refers to having too much work to perform, while the latter refers to the perceived deficiency in terms of skill (French and Caplan 1972). Qualitative overload may cause individual to experience the feeling of inadequacy and dissatisfaction. Such an effect is especially likely to occur for new professionals (DeZoort and Lord 1997).

Related to workload, time pressure is another factor in this category. Time deadline pressure and time constraint pressure arise when employees have to complete tasks by specific points in time. Time deadline pressure influences 55 percent of survey respondents based on a survey conducted by American Anxiety Disorder Association (AADA 2006). Such pressure is especially common among auditors. For example, auditors must file regulatory reports or approve a client management's release of earnings by a certain date. As another example, auditors are required to finish a physical inventory count by a specific date (DeZoort and Lord 1997).

As another example, incentive contracts influence economic motives of employees and create stress. Some forms of incentive contracts imply that the economic welfare of employees is determined by their task performance. Because employees have a motive to maximize their economic benefit, they worry about their performance and factors that may impact their performance. As a result, they become stressed. The stress is highly influenced by the forms of incentive contracts. For example, performance contingent contracts, such as relative performance contracts and piece rate contracts, are more stressful than fixed wage contracts due to economic incentives. Moreover, depending on the magnitude of the incentive and the expectancy of employees' probability of receiving the incentives, economic incentives are expected to induce different levels of stress.

Besides economic motives, employees have social motives. Feedback imposes stress because individuals have social motives such as maintaining a positive self-image or social-image. Feedback influences stress because individuals anticipate that their performance will be evaluated by others within the company (DeZoort and Lord 1997).

Feedback has a direct impact on maintaining self-esteem and can influence individuals' psychological wellbeing (Schuler 1985). Anticipating or having received highly positive feedback can induce stress because of heightened expectations. Anticipating or having received highly negative feedback can induce stress because of its effect on employee motivation (DeZoort and Lord 1997). In an organization, feedback may be formal or informal (DeZoort and Lord 1997). Both forms of feedback are influenced by the management information system. While formal feedback is collected and distributed via the management accounting system, informal feedback may be influenced by management accounting policy, such as the openness or the transparency of the information system. For example, if employee performance information is available to others, it increases the chances of receiving and anticipating informal feedback.

The second category of factors that contribute to stress in the workplace refers to employees' "role in the organization." This category involves situations where employees have multiple responsibilities. Employees usually perform multiple functions and require supervision from multiple supervisors. Some roles may be ambiguous, incompatible or competing (Murphy 1995). Accounting research has investigated pressures caused by role ambiguity, role conflict and perceived environmental uncertainty. Role ambiguity refers to pressure resulting from a lack of understanding regarding one's exact role within the organization. Such lack of understanding may involve inadequate information regarding role expectations, the means to meet expectations and the consequence of role performance (Van Sell et al. 1981). As an example, in management accounting contexts, employees are usually evaluated on their performance across multiple dimensions using the balanced scorecard. Due to the

complex nature of such situations, employees may not know how to make tradeoffs among these dimensions to maximize the welfare of self and the company (Farrell et al. 2008). Such situations cause individuals to experience stress.

Role conflict refers to the incongruity of expectations associated with a role (DeZoort and Lord 1997). Role conflict arises when individuals experience at least two incompatible role pressures simultaneously (Bamber et al. 1989; Wolfe and Snoek 1962). For example, in public accounting context, an auditor is accountable to multiple parties, including clients and supervisors, who have different preferences for performance (Bierstaker and Wright 2001). Such competing goals of employees cause them to experience anxiety and stress (Bagley 2010).

Environmental uncertainty also creates pressure when individuals perceive that they do not have sufficient information, or when they fail to understand or cannot predict factors in the work environment. More importantly, individuals feel stressed because they cannot understand or foresee the possible outcomes associated with their performance or cannot adequately assess how environmental factors affect their performance (Ducan 1972). Environmental uncertainty is an important contextual factor of incentive contracting. In the incentive contracting literature, Holmstrom (1979) developed the informativeness principle, which states that any measure of performance that is informative of agents' effort level should be included in the compensation contract. Based on this principle, environment indicators should be written into contracts, even though these measures do not directly measure agents' effort. Such incentive contracts may create stress as individuals perceive that they lack control over their performance indicators and economic welfare.

The third category of factors that contribute to stress in the workplace refers to “career development.” This category focuses on promotion, job security and career development opportunities. The economics literature documents that to be promoted is an important motive of employees (Lazear and Rosen 1981; Malcomson 1984; Rosen 1986; Prendergast 1993, 1999; Waldman 2003). Promotion is also viewed as a tournament incentive scheme with winners being promoted (Lazear and Rosen 1981). Therefore, the competition involved in promotion may be stressful. In addition, an employee’s job security and career development is heavily influenced by employees’ learning and skill development throughout an employee’s job tenure. Such activities are challenging and difficult and may impose stress. For example, to learn a new technology may be difficult for senior employees. The decision to engage in such activities is an integral part of the effort allocation decision, which concerns the tradeoff between short- and long-term benefit of employees as well as the firm. Such decisions are influenced and facilitated by the incentive contracting practice. When the incentive contracts incentivize people to engage in learning and skill development, it potentially poses challenge and creates stress for some employees.

The fourth category pertains to the interpersonal relationships within the workplace. Employees need to manage their relationships with supervisors, coworkers and subordinates. The amount/nature of interaction is dictated by the design of jobs and control systems. For example, the design of the job determines the number of employees within a work team and the amount of interactions among team members. As another example, incentive schemes determine whether employees are required to compete or collaborate with each other. For supervisor-subordinate interaction, the design of the

control system dictates the amount of discretion supervisors have over subordinate compensation.

The fifth category refers to the organizational structure and climate. This category pertains to the communication pattern, management style and employees' participation in decisions. From a management accounting perspective, this category involves formal information systems and policies. It is also related to the specific practice of participative budgeting and employee self-evaluation, both of which offer opportunities for employees to have a voice in setting goals and performance evaluation (e.g., Blakely 1993; Elicker et al. 2006; Nathan et al. 1991).

In terms of the consequences of stress and pressure, in the accounting literature, to date the majority of stress research has focused on public accounting settings (see DeZoort and Lord 1997 for a review). Outcomes documented in this literature include both behavioral outcomes and attitudinal consequences. Examples of behavioral outcomes are absenteeism, turnover and effectiveness and efficiency of audit performance. Examples of attitudinal consequences include intrinsic and extrinsic job satisfaction, organizational commitment, professional commitment motivation and turnover intentions. The outcome of stress has not been documented in terms of the cooperation decision (i.e., deciding whether to behave cooperatively).

2.3 Stress Coping Behaviors in Collaborative Context

Prior research on stress and emotion suggest that stressful situations triggers anxiety (Lazarus 1993). As discussed in the previous section, stress arises as individuals assess the relationship between themselves and their environment (Lazarus and Folkman 1986). In this relationship, individuals' thoughts of assessment, or cognitive appraisals,

play a key role in the emotional experiences and stress coping behaviors. The primary cognitive appraisal of stressful situation is the anticipation of potential harm and threat. In the workplace, successfully completing tasks and achieving high performance are important goals for employees. The possible failure to achieve goals constitutes harm and threat, because such failure can have significant effects on employees' economic welfare, social-appraisal and/or self-appraisal (e.g., Hannan et al. 2008; Tesser and Campbell 1980). As a result, stressful situations cause people to experience anxiety. Anxiety is an emotion that consists of an affective component and a cognitive-appraisal component. The affective component is a combination of displeasure and high activation (Russell 2003). The cognitive appraisal component is worrying, which is caused by a threat (e.g., Raghunathan and Pham 1999; Maner et al. 2006).

Anxiety causes individuals to develop and engage in compensating strategy. People who are anxious worry about the threat to a current goal (i.e., the source of anxiety) and employ compensating strategies to reduce anxiety to achieve the goal (Eysenck 1992; Eysenck et al. 2007). According to the theory of affect-as-information (Forgas 1995), anxiety triggers the use of compensating strategies, even when a task is incidental to the source of anxiety. Specifically, anxiety motivates an implicit goal of threat reduction. Such motivation operates through feeling monitoring, in which individuals evaluate available options by asking themselves which of the options would make them feel better (Raghunathan and Pham 1999). To my knowledge, no study has directly examined the effect of stress on cooperation. However, evidence in the related literature suggests that the compensating strategy may be either to cooperate or not to cooperate. I discuss theories pertaining to these two perspectives below.

2.3.1 Fight-or-Flight

Threat avoidance has been the dominant strategy of stress coping in the literature. The strategy of fight-or-flight suggests that in response to threat, humans (and animals) may either confront a stressor aggressively or flee (Cannon 1932). Such strategy is supported from physiological, cognitive and behavioral perspectives. First, from the physiological perspective, studies have documented that under stress a series of physiological responses increases individuals' vigilance and prepares the body to better escape from dangerous situations. Physiological responses to stress, such as degrading of glycogen to glucose and increasing cardiovascular activity prepares the body to respond to threats of all kinds, including dangerous conditions such as fire, attacks by predators or assaults by members of the same species (Bartlett 1998; Mizock 1995). The specific biological mechanism is the "sympathetic nervous system activation that innervates the adrenal medulla, producing a hormonal cascade that results in the secretion of catecholamine, especially norepinephrine and epinephrine into the bloodstream (Taylor et al. 2000, 411)."

Second, from a cognitive perspective, studies have shown that anxiety increases attention to threat-related stimuli (e.g., Eysenck et al. 1987; Pishyar et al. 2004). On the one hand, anxious individuals exhibit a reduction in detection time of threat-related stimuli (for a review, see Fox and Georgiou 2005). For example, Byrne and Eysenck (1995) required participants to detect angry faces among neutral crowds. The speed of detection is faster for the high-anxious group than that of the low-anxious group. On the other hand, anxious individuals also display slower disengagement from threat-related stimuli. Such effect is investigated using the dot-prob task, in which participants respond

when a dot is detected. Experimental evidence suggests that although anxious participants' detection response is faster to a dot if the dot is replaced with a threat-related stimulus than non-anxious participants, anxious participants' detection response is slower to a dot if the dot is replaced with a neutral stimulus. Such effect is driven by the difficulty anxious individuals have in disengaging from threat-related stimuli (e.g., Eysenck et al. 1987, Pishyar et al. 2004).

Third, also following a cognitive perspective, studies investigate the risk appraisal tendency of anxious individuals. These studies have shown that anxiety influences the assessment of ambiguous situations, such as perception of the severity and likelihood of negative outcomes. Such assessment, in turn, enhances individuals' risk-avoidant orientation. For example, in the clinical psychology literature, it is documented that social anxiety disorder and phobic avoidance individuals exhibit negative expectancies (e.g., Barlow 2002; Butler and Mathews 1983; Sloan and Telch 2002; Telch et al. 1989). They tend to overestimate the likelihood and the intensity of distress involved in social events (Foa et al. 1996; Lucock and Salkovskis 1988). Similarly, generalized anxiety disorder individuals tend to overestimate the likelihood and intensity of distress associated with negative experiences in general (Butler and Mathews 1987). In a non-clinical sample of university students, Maner and Schmidt (2006) provide evidence that trait anxiety is associated with pessimistic risk appraisals (i.e., heightened perceptions of the likelihood and the severity of negative outcomes) and an exaggerated tendency to engage in risk-avoidant decision making.

Fourth, consistent with risk-averse orientation under stress, behavioral research documents that stress and anxiety increase risk-avoidant behavior in decisions (e.g., Clark

et al., 2012; Raghunathan and Pham, 1999). With respect to decisions with hypothetical payoffs, Raghunathan and Pham (1999) show that participants in anxious moods tend to prefer the low risk-low payoff gamble compared to neutral mood participants. They also show that participants in anxious moods favor the low salary-high security job compared to neutral mood participants. Similarly, Clark et al (2012) document that the threat of electric shock produced increased electrodermal activity and a sustained decrease in heart rate, consistent with defensive vigilance. Such threat also exerts immediate effects on decision making, biasing participants towards safer alternatives.

In sum, the fight-and-flight strategy is supported by various studies using different approaches. These studies document that stress enhances vigilance and increases attention to threat-related factors. In addition, stressed individuals make negative risk assessments and exhibit risk-avoidant behaviors. Such tendencies potentially affect individuals' willingness to cooperate, because the collaborative context involves relational risk, which is the possibility of being exploited by a partner. Although based on the game theory the relation risk is 100% and should not be considered in decisions, as discussed in the literature review section, individuals do not always shirk. More importantly, they do not believe that others always shirk. The relational risk constitute a threat to individual's welfare: the individuals' welfare is higher when the cooperation partner choose to exert effort than when the cooperation partner choose not to exert effort. According to the above reviewed evidence on the fight-and-flight strategy, in a collaborative context, stressed individuals may be more vigilant to relational risk than non-stressed individuals. As a result, they are more willing to attend such information and act accordingly. That is to say, stressed individuals are less likely to cooperate as

they worry about being exploited. In addition, stressed individuals may form negative expectations about the behavior of a cooperation partner. As a result, stress may obstruct cooperation.

2.3.2 Tend-and-Befriend

Fight-or-flight does not provide a complete picture of humans' stress coping. Humans also respond to stress by forming affiliations. This strategy, termed "tend-and-befriend," suggests that individuals provide and receive joint protection by forming groups in threatening times (Baumeister and Leary 1995). The psychology research has a long history of investigating the need to belong. Early conceptualizations date back to the 1930s, when Freud (1930) asserted that humans had a need for interpersonal contact. As another example, Maslow (1968) ranked "love and belongingness needs" as one of his motivational hierarchy. According to Maslow, the need to belong emerge after basic needs such as hunger and safety, but before advanced needs such as esteem and self-actualization. Consistent with these early conceptualizations, many other studies have also made suggestions that belongness is one of the basic needs of human (e.g., Epstein 1992; Ryan 1991). Baumeister and Leary (1995) formally proposed and evaluated such need by synthesizing empirical evidence. This study concludes that the need to belong is the need for frequent, nonaversive interactions within an ongoing relational bond. People seek to form social attachment, and meanwhile, resist the dissolution of existing bonds. Lack of attachment is associated with negative consequences in terms of health, adjustment and well-being.

Recent studies provide a biological account of this effect (Taylor 2006; Taylor et al. 2000). This research suggests the existence of an affiliative neurocircuitry that

prompts affiliation in response to stress. People have a need to maintain an adequate level of protective and rewarding social relationships, just as people have basic needs, like hunger, thirst, sexual drives and other appetites. The neurocircuitry system regulates social-approach behavior in the same way as systems that regulate behaviors to satisfy other appetitive needs. Oxytocin is released in response to (at least some) stressors. It prompts affiliative behavior in response to stress, in conjunction with dopaminergic and opioid systems. The level of oxytocin is reduced (heightened) if social contacts are supportive and comforting (unsupportive and hostile) (Taylor 2006). Similarly, in clinical psychology, research provides evidence that availability of social support before exposure to acute social stress is associated with attenuated cortisol and cardiovascular activity, indicating that social support may play a role in preventing and reducing stress (e.g., Christenfeld et al. 1997; Baumgartner et al. 2003).

To my knowledge, the only studies that investigate the effect of stress on socio-economic decision is von Dawans et al. (2012), which suggest that stressed people engage in social-approach behavior because attachments to social groups operate as a stress buffering strategy. This study operationalized stress using the standard laboratory stressor, in which the stressed group completes 12 minutes of a public speaking task and 8 minutes of a mental-arithmetic task. By contrast, the control group completes 12 minutes of simultaneous group reading in a low voice and 8 minutes of an easy counting task (von Dawans et al. 2012). This study provides evidence that participants who experienced a socio-evaluative threat exhibit more pro-social behavior in a trust game and in a binary dictator game than participants who did not experience a socio-evaluative threat. A potential implication is that stress can facilitate cooperation.

Although the theories of fight-or-flight and tend-and-befriend offer conflicting predictions about the effect of stress on cooperative behaviors, both theories have solid evolutionary and psychological bases and potentially apply to collaborative settings. I explore different situations in which either strategy will dominate in people's response.

CHAPTER 3

THEORY AND HYPOTHESES

3.1 Ego and External Stressors

As is discussed in the previous section, prior studies classify stressors into five categories including (1) factors unique to the job, (2) role in the organization, (3) career development, (4) interpersonal work relationships and (5) organizational structure/climate. While this classification scheme is very descriptive of potential sources of stress, it is not informative as to the behavioral effects of stressors. To shed light on the effects of stressors on cooperation, I propose an alternative classification scheme in this paper.

Stressful situations may differ in the responsibility of possible failure. Based on cognitive appraisal theory, responsibility is one of the basic dimensions that people constantly assess (consciously or unconsciously): for a given situation, one may perceive that the self is responsible or that someone or something else is responsible (Smith and Ellsworth 1985). As is discussed, stress arises when individuals sense the possibility of failure to achieve personal goals based on their assessment of the relation between themselves and the environment, especially when they perceive that their resource level is relatively low while the demand level in the environment is relatively high (Lazarus and Folkman 1986). Depending on the relative salience of the two aspects, stress differs in the secondary cognitive appraisal of responsibility: one may perceive that the self is responsible or that threat-related factors in the environment are responsible.

Based on the differences in responsibility, I classify stressors into two types, ego and external stressors. First, I define ego stressors as factors that cause individuals to worry about their own capabilities and pose a threat to goal achievement. That is, under ego stressors, the possibility of failure to achieve goals is attributed to individuals' inabilities to meet task demands. Examples of ego stressors include skill or knowledge deficiencies, performance feedback and time pressure. In my definition, I use the word "ego," which means self or self-esteem (Merriam-Webster 2013), to highlight two important aspects of this type of stress. First, stressors are defined based on different attributions of possible failure rather than the origin of stressors. Specifically, ego stress causes individuals to question their own capabilities and influences their self-concept negatively. Importantly, ego stressors may originate within (e.g., skill deficiency) or outside (e.g., performance feedback) an individual. Second, for this type of stress, one perceives either consciously or unconsciously that oneself rather than other people or environmental factors is responsible for the outcomes. Under this type of stress, people feel compelled to maneuver their available resources to achieve their goals. Third, the type of stress is determined by the responsibility perception, which is formed at the stressed moment rather than any other moment. That is to say, perception of responsibility may change throughout the task. Such perception is especially likely to change after the task depending on whether a person succeeded due to the self-serving attribution. These ex post attribution does not determine the type of a stressor.

Many factors in the workplace, particularly "factors unique to jobs," fall within this category. Because jobs are designed for employees to perform, employees often have a strong influence over job-related outcomes. During a task, employees focus on

the amount and the intensity of effort to exert. They also choose among available strategies to perform the task. For example, work load, time pressure, incentive contracts and performance feedback and influence employees effort and performance. These factors also influences individual perceptions regarding whether they are capable of fulfilling task demand, as a result, create ego stress. Similarly, in the category of “career development,” factors such as learning a new technology can be very challenging for some people. Therefore, they are likely to be ego stressors most of the time.

I define external stressors as factors in the environment that pose a threat to goal achievement. That is, under external stress, threat-related environmental factors are responsible for possible failure. External stressors has the following characteristics. First, external stressors originate outside an individual. They are uncertain or uncontrollable factors in a business environment or within an organization. Second, with this kind of stress, individuals perceive that they cannot exert influence over the outcome or situation. Either someone else is controlling the situation or no one can influence the situation. That is to say, the outcome of the situation may be undesirable even if individuals exert effort to their full capacity. Third, similar to ego stress, the responsibility, which is perceived at the stressed moment, determines the type of stress. Such perception may change over time.

Many factors of “roles in the organization” are external stressors. I explain role ambiguity, role conflict and uncertainty with examples. Regarding role ambiguity and role conflict, employees become stressed when they face difficulties making effort-related choices or making decisions due to the difficulty of identifying an optimal strategy. For example, when employees are compensated along multiple job dimensions

that are conflicting, they may perceive that it is impossible to identify an optimal strategy, even though an optimal strategy exists. As another example, when employees are compensated based on environment indicators, employees may perceive that they have no influence over these indicators, even though such indicators are informative of effort level and, therefore, increase the efficiency of the compensation contract. As a result, they feel uncertain about their welfare. Regarding the perceived environmental uncertainty, employees are stressed because they cannot predict factors in their environment, or they do not understand the impact of these factors on performance. For example, the risk that comes from market forces, such as competition and demand fluctuation, may prevent an employee from meeting a performance target. As another example, information about an upcoming organizational restructuring poses a threat to employees' job security and future economic well-being. In these cases, employees perceive that uncontrollable factors, instead of themselves, are responsible for the possible failure to achieve their goals.

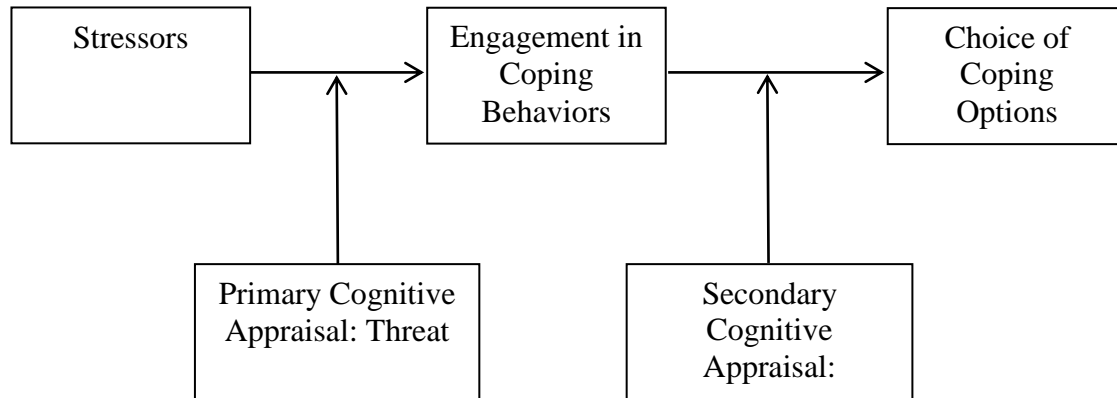
Factors of "interpersonal relationships" also are likely to be external stressors. Stressors such as harassment, discrimination, biased opinions, hearsay, and other derogatory remarks are initiated by other people. Although employees may have some influence over these stressors by changing their own behavior or by reporting others' bad behavior, employees cannot take control over these adverse situations in the short term. As a result, they feel distressed and hostile toward others.

3.2 Stress Coping Behaviors under Two Stressors

As discussed earlier, I expect all stressors to induce the primary cognitive appraisal of perceived threat, which activates the emotion of anxiety and triggers coping

behavior. In this section, I argue that due to the secondary cognitive appraisal of responsibility, stressors trigger additional subsets of emotions in addition to anxiety. As a result, different types of stressors lead to different choices of coping options. See Figure 1 for the theoretical framework.

Figure 1 Theoretical framework



In the presence of an ego stressor, one attributes the possibility of failure to oneself. In other words, individuals worry that their own capabilities are not sufficient to satisfy task demands. Such situations of inadequacy reduce individuals' self-confidence and self-esteem. As a result, individuals experience a reduction in strength and pride (Hewitt 2009). I expect this kind of cognitive appraisal to prime the motivational tendency of protection-seeking, and as a result, an individual will act more cooperatively. From the perspective of motivational tendency, because ego stress causes a feeling of inadequate competence, it primes an individual to seek help and joint-protection. Because help and protection can be obtained via affiliations (Baumeister and Leary 1995), the presence of ego stress is expected to increase affiliative behavior, promoting cooperation.

Prior studies provide evidence consistent with the prediction that ego stress increases cooperation. As discussed earlier, in response to some stressors, the biological mechanism of affiliative neurocircuitry prompts affiliative behavior (Taylor 2006; Taylor et al. 2000). Other evidence has shown that ego stress facilitates affiliative behaviors in a lab experiment (von Dawans et al. 2012). Specifically, the presence of ego stressors induced by public speaking and mental math calculations increase trusting and sharing behaviors in trust games and dictator games, respectively. Therefore, I expect that people are more willing to cooperate when the level of ego stress is high than when it is low.⁵

H1: Individuals are more likely to cooperate when the level of ego stress is high than when it is low.

In contrast, in the presence of external stressors, the possibility of failure in completing a task is attributed to threat related factors in the environment. For external stress, individuals perceive that factors in the environment may hinder their goal achievement. In such situations, individuals experience antagonism and enmity toward someone or something that is causing this situation. As a result, individuals may feel hostile and angry (Yik et al. 2011). I expect that this kind of cognitive appraisal will prime the motivational tendency of threat-avoidance, causing an individual to act less cooperatively. From the perspective of motivational tendency, because external stress induces a feeling of hostility and enmity, it motivates an individual to avoid threat and

⁵The prediction that ego stressors increase cooperation is not due to the increase in risk taking. In fact, studies show that ego stressors decrease or do not change risk taking in individual economic decisions. For example, Yip and Cote (2013) show that anxiety induced by public speaking reduces risk-seeking in choosing gambles. As another example, socio-evaluative threats induced by public speaking and mental math problems do not influence risk preferences in choosing gambles (von Dawans et al., 2012).

risk that are present in the environment. As a result, external stress reduces an individual's willingness to bear relational risk.

The prediction that external stress decreases cooperation, consistent with the “fight-or flight” strategy, is supported by extant findings. Studies have shown that various external stressors lead to risk-averse behavior. For example, Clark et al. (2012) operationalizes stress as an intermittent delivery of mild electric shock. This study suggests that individuals under stress make more risk-avoidant choices in a gambling task than those who are not under stress. As another example, Raghunathan and Pham (1999) operationalize anxiety by requiring participants to imagine a scenario in which the person might have cancer, but the experimenter does not reveal the outcome of the doctor's visit. This study suggests that individuals under stress make more risk-averse choices in gambles and in job selection. While these prior studies focus on individual economic decisions, I am not aware of any studies that examine the effect of external risk in the context of relational risk.

The relational risk is fundamentally different from the economic risk for the following reasons. First, the economic risk involves the objective probability of each perspective outcome. By contrast, relational risk involves the perceived probability of other people's behavior. Second, in studies that investigate economic risk-taking behaviors, the expected value is held constant across all options. In such cases, individuals face the choice between relatively safe and relatively risky options. By contrast, when individuals make decisions involving relational risks, their outcome realizations are always contingent upon others' behavior. That is to say, choosing not to cooperate is not “safer” than choosing to cooperate. However, I argue that individuals'

mental representation of the cooperation decision may lead them to perceive that choosing to cooperate exposes themselves to the threat of relational risk. Specifically, when individuals choose to cooperate, they perceive that they are being exploited if their partners choose not to cooperate. By contrast when individuals choose not to cooperate, they do not perceive that they are being taken advantage of if their partners choose not to cooperate. As a result, individuals perceive that choosing to cooperate exposes themselves to the threat of being exploited, choosing not to cooperate avoid such possibilities. Therefore, because external stress causes individuals to avoid threat, individuals are less likely to cooperate when they are under high level of external stress than when they are under low level of external stress.

H2: Individuals are less likely to cooperate when the level of external stress is high than when it is low.

CHAPTER 4

PRETEST

Given my hypotheses that different types of stressors can have distinct effects on emotional responses and decision making, it is important to ensure that my manipulation induces these emotional states effectively. My manipulation was designed after that used by Milkman et al. (2012), which involved participants writing about stressful scenarios and their feelings in these scenarios. In this section, I first explain the advantage of such manipulation. I then discuss pretest results which assess the effectiveness of my manipulation.

4.1 Advantage of Directed-writing Task

I choose to induce stress and anxiety incidentally, instead of integrally. Incidental emotion means that the source of the emotion is not related to the decision task; integral emotion means that the source of the emotion is part of the decision task (Lerner et al. 2007). From the methodological perspective, incidental manipulation is better in terms of testing the causal relationship between stress and behavioral consequences. The issue of manipulating stress integrally is that these manipulations results in confounds in determining the effect of stress on behavior. Below, I illustrate such confounding effects with the example of the effect of time pressure on cooperation. Based on my theory of stress coping behaviors, the hypothesized relationship is that time pressure causes individuals to experience ego stress and, therefore, behave more cooperatively. If I use an integral manipulation, that is, if I use one single task to impose time limitation and to

elicit effort level, the manipulation of time limitation itself reduces the amount of time available to perform the task and influences the duration and the intensity of effort. In addition, the manipulation of time limitation reduces the amount of time available to make thoughtful evaluations of available options. Individuals may change their effort level simply because they do not have enough time to understand the incentive structure of the cooperation issue. As a result of such confounding arguments, one cannot tell whether and how stress plays a role in the presence of time pressure.

I choose the directed-writing task to induce the perceived stress, instead of manipulating the stressors directly in the lab for the following reasons. First, the directed-writing task is likely to induce emotion successfully. People experience various emotions on a daily basis. The directed-writing task allows researchers to simulate such emotions in the laboratory. This technique was first developed by Strack et al. (1985), and it has been used in numerous studies to induce various emotions (e.g., Dunn and Schweitzer 2005; Fessler et al. 2004; Lerner and Keltner 2000). Second, the directed-writing task is not influenced by any task-specific skill or task-specific confidence of a participant. By manipulating a stressor in a direct way, the experimenter needs to employ a specific task such as the mental math calculation task. Participants' skill level and confidence level is expected to influence the perceived stress. Specifically, participants are less likely to feel stressed if they perceive their skill is strong. As a result, such manipulation of stress is unlikely to be effective for all participants. Third, the directed-writing task is not influenced by personality characteristics. The affective state of stress is likely to be influenced by the personality characteristic of trait anxiety. Specifically, trait anxiety is a level of anxiety that an individual generally feels (Spielberger et al.

1983). When exposed to a situation stimuli, high-trait anxiety individuals are more likely to experience state anxiety than low-trait anxiety individuals. Fourth, the cognitive effort required to complete tasks in different conditions is constant. Potentially, stressors such as task difficulty cause a difference in cognitive processing and induce different levels of depletion of cognitive resources. As a result, such stressors influence subsequent decision processes.⁶ Fifth, this manipulation is independent of individuals' economic incentives. Sixth, this manipulation does not introduce confounding factors or mechanisms involved in stressors, such as performance feedback and time pressure.⁷

4.2 Ego Stressors

In this study, I operationalize different levels of ego stress by inducing different levels of perceived skill deficiency. Participants in the study complete a directed-writing task, with those in the high ego stress condition (HIGHEGO) writing about the weaknesses that they are most worried about, and those in the low ego stress condition (LOWEGO) writing about the strengths that they are most content about. In four sequential questions, participants first briefly describe their weaknesses (strengths) in terms of skill that they are most worried (content) about. Then, they describe one situation that their weaknesses (strengths) in skill may bring negative (positive) consequences in the future. Participants are asked to describe it such that a person

⁶ Performing cognitively challenging tasks depletes self-regulatory resources and impairs performance in subsequent tasks if these tasks require the executive function, such as inhibition, shifting, and working memory updating (Hagger et al. 2010).

⁷ For example, feedback valence might influence individuals' willingness to cooperate. As another example, time pressure might increase the use of an intuitive decision mode (as opposed to deliberative decision mode) and increase cooperation (Rand et al. 2012).

reading the description would understand their situation and feel worried/content just from reading about it. In the last two questions, participants describe their emotional and physical reactions when they thought about their weaknesses (strengths). This manipulation is adapted directly from Milkman (2012).

In the pretest, I measure participants' emotions following the directed-writing task. Participants answered questions concerning how they felt using a four-point scale, with one anchoring on "*not at all*," and four anchoring on "*very much*." Measures of emotions include a total of twenty items. Among these twenty items, six are measures of anxiety from Marteau and Bekker (1992), including calm (reverse-coded), upset, tense, relaxed (reverse-coded), content (reverse-coded) and worried. According to Marteau and Bekker (1992), the state anxiety index, *anxiety*, is computed as the sum of all six items. In addition, measures include fourteen items of other emotions from Watson et al. (1988). These 14 items are interested, enthusiastic, scared, attentive, determined, inspired, alert, alert, active, strong, proud, ashamed, guilty, irritable and hostile.

Forty participants recruited from Mturk participated in the pretest. Twenty-one participants were randomly assigned to the HIGHEGO condition and 19 to the LOWEGO conditions. Average *anxiety* was 14.81 in the HIGHEGO condition and 9.47 in the LOWEGO condition. The difference in *anxiety* was statistically significant with a *p-value* less than 0.001 (two-tailed). This result shows that requiring participants to write about a high ego stress situation induces a higher level of anxiety than requiring them to write about a low ego stress situation.

Ego stress also influences other emotions. I next discuss these emotions as they are informative of individuals' thoughts, which shed light on cognitive appraisals and

tendencies. First, high level of ego stress leads to a lower level of pride ($p < 0.01$, two-tailed) and strength ($p < 0.01$, two-tailed) than low level of ego stress. Such evidence is also consistent with the concept of ego stress. As individuals perceive that their capabilities are inadequate, they perceive a low level of personal strength and pride. Further, high level of ego stress leads to lower responses to enthusiasm ($p = 0.02$, two-tailed), interest ($p = 0.01$, two-tailed) and inspire ($p < 0.01$, two-tailed) than low level of ego stress. Panel A of Table 1 reports the mean and standard deviation of self-reported emotion for the two conditions. This table also reports the p-value of the pairwise comparisons of emotions between the two conditions.

Table 1: Self-reported Emotion in Pretest

Panel A: Self-reported Emotion in Ego Stress Pretest

| Emotion | HIGHEGO condition N=21 Mean [SDs] | LOWEGO condition N=19 Mean [SDs] | p-value (two-tailed) |
|---------------|---|--|-------------------------|
| Anxiety Index | 14.81 [4.61] | 9.47 [2.64] | <0.001 |
| Calm | 2.29 [0.96] | 3.05 [0.62] | <0.001 |
| Tense | 2.43 [0.93] | 1.26 [0.56] | <0.001 |
| Upset | 1.76 [0.89] | 1.21 [0.71] | 0.019 |
| Relaxed | 2.38 [0.92] | 3.05 [0.71] | <0.001 |
| Content | 1.95 [0.97] | 3.05 [0.52] | <0.001 |
| Worried | 2.24 [0.94] | 1.16 [0.37] | <0.001 |
| Interested | 2.62 [0.86] | 3.26 [0.73] | 0.016 |
| Enthusiastic | 1.86 [0.96] | 2.63 [0.90] | 0.012 |
| Scared | 1.90 [0.77] | 1.21 [0.54] | 0.002 |
| Attentive | 3.10 [0.70] | 3.11 [0.88] | 0.968 |
| Determined | 2.76 [1.00] | 3.00 [0.58] | 0.367 |
| Inspired | 1.90 [0.94] | 3.11 [0.66] | <0.001 |
| Alert | 3.33 [0.66] | 2.89 [0.81] | 0.067 |
| Active | 2.43 [0.93] | 2.79 [0.85] | 0.210 |

| | | | |
|-----------|-------------|-------------|--------|
| Strong | 2.24 [0.94] | 2.95 [0.62] | 0.009 |
| Proud | 2.00 [0.95] | 3.05 [0.71] | <0.001 |
| Ashamed | 1.67 [0.91] | 1.11 [0.32] | 0.015 |
| Guilty | 1.52 [0.81] | 1.21 [0.71] | 0.205 |
| Irritable | 1.67 [1.02] | 1.21 [0.54] | 0.089 |
| Hostile | 1.38 [0.86] | 1.05 [0.23] | 0.117 |

Panel B: Self-reported Emotion in Ego Stress Pretest

| Emotion | HIGHEXTERNAL condition N=21 Mean [SDs] | LOWEXTERNAL condition N=19 Mean [SDs] | p-value (two-tailed) |
|---------------|---|--|-------------------------|
| Anxiety Index | 14.74 [4.64] | 9.59 [2.11] | <0.001 |
| Calm | 2.32 [1.00] | 3.09 [0.53] | 0.003 |
| Tense | 2.26 [0.87] | 1.32 [0.57] | <0.001 |
| Upset | 1.89 [0.81] | 1.05 [0.21] | <0.001 |
| Relaxed | 2.21 [0.98] | 3.05 [0.72] | 0.003 |
| Content | 2.26 [0.99] | 2.86 [0.71] | 0.030 |
| Worried | 2.37 [0.83] | 1.23 [0.43] | <0.001 |
| Interested | 2.68 [0.89] | 2.77 [0.69] | 0.720 |
| Enthusiastic | 2.11 [0.99] | 2.23 [0.92] | 0.686 |
| Scared | 1.89 [0.94] | 1.05 [0.21] | <0.001 |
| Attentive | 3.26 [0.81] | 3.09 [0.53] | 0.417 |
| Determined | 2.68 [1.11] | 2.59 [1.01] | 0.779 |
| Inspired | 2.16 [1.17] | 2.41 [0.85] | 0.432 |
| Alert | 3.00 [0.94] | 3.00 [0.82] | 1.000 |
| Active | 2.47 [0.84] | 2.32 [0.99] | 0.595 |
| Strong | 2.11 [0.88] | 2.27 [0.98] | 0.571 |
| Proud | 2.05 [1.03] | 2.27 [1.03] | 0.499 |
| Ashamed | 1.58 [0.96] | 1.05 [0.21] | 0.015 |
| Guilty | 1.58 [1.07] | 1.09 [0.29] | 0.074 |
| Irritable | 1.89 [0.94] | 1.09 [0.29] | <0.001 |
| Hostile | 1.58 [1.02] | 1.00 [0.00] | 0.011 |

Notes:

Cell mean reports participants' responses to questions of how were they feeling for each of the 20 items on a four point scale. 1 = not at all and 4 = very much. Anxiety index is the sum of six items, calm (reverse-coded), upset, tense, relaxed (reverse-coded), content (reverse-coded) and worried.

High level of ego stress also leads to a higher responses to scare ($p < 0.01$, two-tailed) and shame ($p = 0.02$, two-tailed) than low level of ego stress. The emotion that arising from being scared is related to the fear of negative outcomes. Such emotion is in line with the concept of threat, which involves the possible failure of goal achievement. The emotion of shame has a few cognitive characteristics, including lack of control, being inferior to others and feeling observed by others (Tangney 1993). All of these characteristics are consistent with the appraisal of high ego stress situations. Under ego stress, personal weaknesses cause people to perceive that they cannot control the situation. Moreover, ego stress arises due to a threat to one's self-image of being competent. In addition, the writing task, which forces people to expose their weakness to the experimenter, may cause people to feel that they are being observed by others and heighten the feelings of shame.

4.3 External Stressors

I operationalize external stress by manipulating perceived uncertainty. The procedure is the same as that used in Milkman (2012). Participants in the study completed a directed-writing task, with those in the high external stress (HIGHEXTERNAL) condition writing about things that they are most uncertain about in their life and those in the low external stress (LOWEXTERNAL) condition writing about things that they are most certain about. Then, they describe the one situation that has made them the most uncertain they have been in their life (the last time they sat in a quiet

place). Participants are asked to describe it such that a person reading the description would become uncertain (feel that they have been there just from reading about it). In the last two questions, participants describe their emotions and physical reactions when they feel uncertain (sat in a quiet place).

Forty participants were recruited from MTurk to participate in the pretest; 19 participants were randomly assigned to the HIGHEXTERNAL condition and 21 to the LOWEXTERNAL condition. Similar to the pretest of the ego stress, participants complete the same 20-item emotion instrument following the directed-writing task. Average *anxiety* was 14.73 in the HIGHEXTERNAL condition and 9.52 in the LOWEXTERNAL condition. The difference of *anxiety* was statistically significant, and the *p-value* was less than 0.01 (two-tailed).

External stress also induces other emotions. Different from ego stress, high external stress increases the emotions of hostility ($p=0.01$, two-tailed) and irritability ($p<0.01$, two-tailed) compared to low external stress. Such evidence sheds light on the emotional structure of different types of stress. My theory is that both types of stress induce negative affective states of anxiety, which drive people's behavior to reduce such negative states. More importantly, two types of stress engender additional thoughts and tendencies, which dictate the specific type of stress coping behavior. The hostile and irritable feeling induced by high level of external stress implies the thought of unfriendliness, enmity and opposition. The presence of thoughts are consistent with the argument that high level of external stress causes people to feel that factors in their environment are unfavorable and may cause them to fail to achieve their goals. As a result, people are expected to be less willing to be exposed to threat related factors.

Different from ego stress, self-reported positive emotions are not different between high and low levels of external stress. These results clearly indicate that the two types of stress induce different sets of emotions. The cognitive contents of emotions are consistent with the definitions of the different types of stress. Panel B of Table 1 reports the mean and standard deviation of self-reported emotions for the two conditions. This table also reports the p-value of the pairwise comparisons of emotions between two conditions.

Similar to ego stress, external stress increases participants' negative emotions of shame and being scared. Response to scare are higher for high external stress participants compared to low external stress participants, with a p-value smaller than 0.01 (two-tailed). The emotion of scare arises as people feel fearful of possible failure. Shame also is higher for high external stress participants than low external stress participants, with a p-value of 0.015 (two-tailed). This emotion of shame may be induced as people feel that their lack of control and their inferior situation is disadvantageous compared to other people.

CHAPTER 5

EXPERIMENT ONE

I conducted an experiment to test hypothesis 1, involving ego stress. In this experiment, participants complete two tasks, a directed-writing task and a Prisoner's Dilemma game. Task 1 is the directed-writing task, in which I manipulated the independent variable of ego stress in the same way as the pretest. Task 2 is an incentivized decision task: the setup is similar to a Prisoner's Dilemma game in which participants decide whether to contribute to a common project. The dependent variable is the binary decision of whether to contribute.

5.1 Manipulation

A directed-writing task is used to manipulate stress as discussed in the previous chapter. In the main experiment, I did not measure emotions after the directed-writing task and before the decision task, because lengthy emotion self-reports may reduce the influence of emotion on judgment (e.g., Cook and Campbell 1979) and therefore weaken the proposed effects. Several studies have used the same method, in which researchers conducts a pretest, which includes the manipulation and the emotion measures, and a main experiment, which includes the manipulation and the judgment task (Raganathan and Pham 1999; Dunn and Schweitzer 2005; Lerner Keltner 2001).

5.2 Decision Task

Immediately after the directed-writing task, participants complete a decision task. Before learning the information related to the decision, participants are reminded that

they will receive additional payment, the amount of which is determined by their decision and that of another randomly selected Mturk participant with whom they are paired. In addition, they are provided with detailed information about the way the additional payment is administered. Next, participants are informed that they will make only one decision. The decision task follows.

“You and the other Mturk participant will decide separately whether you would like to CONTRIBUTE your endowment (20 cents) to a COMMON PROJECT. If BOTH of you decide NOT to contribute, both of you will keep your endowment (20 cents). If BOTH of you decide to contribute, both of you will get 40 cents. If ONLY ONE OF YOU decides to contribute, the one who contributes will get 0 cents, the one who does NOT contribute will get 70 cents.”

Participants make a simple binary choice: “Your decision is to Contribute/Not Contribute.”⁸ For this decision task, I describe the Prisoner’s Dilemma game in the context of investing in the common project, instead of using completely abstract language such as choosing between options A and B. The purpose of this design choice is to allow participants to perceive the common project as a medium of forming affiliations, which is a key argument underlying my theory. This design choice has external validity: it is consistent with an organizational context, where employees make a decision of whether to exert effort toward a group project.

⁸ I use an abstract choice task to measure cooperation for two reasons. First, an abstract effort choice is a precise measure, because it is not influenced by individuals’ task specific skills. More importantly, prior studies suggest that stress and anxiety influence individuals’ cognitive performance and task outcomes (e.g., Eysenck 2007; DeZoort and Lord 1999). Therefore, using an abstract task avoids this confounding effect.

After making their decisions, participants complete a post-experimental questionnaire, including questions related to their decision processes, risk attitude, and demographic information. Specifically, questions about decision processes elicits participants' desire to cooperate, estimates of others choices, concerns about their own payment, concerns about the partner's payment, ethical sensitivity, motives to manage impression, motives to avoid feeling guilty and team identity. Demographic questions requires people to report their gender, age, education and work experience.

5.3 Participants

This experiment was conducted using Mturk, which offers immediate access to a large participant pool. Prior findings suggest conducting my study on Mturk is appropriate. First, lab results of Prisoner's Dilemma games are replicated successfully using online participants. Horton et al. (2011) show that the levels of cooperation are not statistically different when the game is played online versus in a physical lab, with the payoffs in the physical lab being 10 times the amount in the online experiment. Second, lab results of priming effects are replicated successfully with online participants. Online participants respond to priming effects by altering their choices in ways consistent with that of lab participants. Because an important part of my theory is cognitive priming, I expect online participants to provide valid results. Third, the directed-writing task in my experiment is reported to have been used successfully with online participants (Milkman 2012). Therefore, it is justifiable to use online participants to test my theories.

Thirty-eight participants were recruited on MTurk. Table 1 provides a summary of demographic information, including gender, age, education, and work experience. Nineteen participants are randomly assigned to the HIGHEGO condition and 19 to the

LOWEGO condition. There is no statistically significant difference in demographic characteristics between the two groups. Participants receive a fixed payment of \$0.60 for taking part in my experiment. They receive an additional \$0.20 for completing the post-experiment questionnaire. In addition, they receive, on average, \$0.54 representing decision-contingent bonuses based on their choices in the decision task and in incentivized post-experiment questions (explained in detail in the additional analyses). On average, participants spend about 10 minutes on the task.⁹

Table 2: Demographic information of experiment one

Panel A: Gender

| Gender | Proportion |
|--------|------------|
| male | 61% |
| female | 39% |

Panel B: Age

| Age | Proportion |
|-------|------------|
| <20 | 3% |
| 20-29 | 50% |
| 30-39 | 24% |
| 40-49 | 18% |
| >50 | 5% |

Panel C: Education

| Education | Proportion |
|-------------------|------------|
| High school | 13% |
| Vocational school | 5% |
| Some college | 32% |
| Bachelor's degree | 37% |
| Master's degree | 13% |

⁹ Participants received a total compensation of \$1.34 for the participation of about 10 minutes. The hourly rate is \$8.04, which is higher than the average hourly rate on MTurk of \$6 per hour.

Panel D: Work experience

| Mean | Std. Dev. | Min | Max |
|-------|-----------|-----|-----|
| 11.29 | 9.50 | 1 | 35 |

5.4 Descriptive Statistics

The dependent variable is the binary choice of whether participants decide to contribute to the common project, defined as 1 if a participant contributes and 0 otherwise. In the HIGHEGO condition, 13 of 19 (or 68 percent) participants chose to cooperate. In the LOWEGO condition, on the other hand, only 5 of 19 (or 26 percent) participants chose to cooperate. This finding is consistent with my prediction that the cooperation rate is higher in the HIGHEGO condition than in the LOWEGO condition. Panel A of Table 3 presents the mean of *cooperation* for the two conditions.

Table 3: Experiment results of experiment one

Panel A: Descriptive statistics

| | The HIGHEGO condition (N = 19) | The LOWEGO condition (N = 19) |
|---------------------|-----------------------------------|----------------------------------|
| Mean of cooperation | 0.68 | 0.26 |

Panel B: Logistic regression analysis (Dependent variable = cooperation)

| | Coef. | Std. Err. | z-score | p-value | [95% Confidence Interval] |
|-----------|-------|-----------|---------|---------|---------------------------|
| Stress | 1.78 | 0.72 | 2.46 | P<0.01* | [0.36, 3.20] |
| Gender | 0.14 | 0.74 | 0.20 | 0.85 | [-1.30, 1.59] |
| Intercept | -1.22 | 1.11 | -1.10 | 0.273 | [-3.4, 0.96] |

Notes:

Stress = zero for the LOWEGO condition, and one for the HIGHEGO condition.

Gender = zero for female, and one for male.

Cooperation = zero if participant choose to contribute, and one otherwise.

An asterisk indicates a one-tailed *p-value* for testing a directional prediction.

5.5 Test of H1

To test H1, I perform a logistic regression with *cooperation* as the dependent variable, the experimental condition of *stress* as the independent variable, and *gender* as a control variable. The reason I control for gender in the analysis is because it has been shown to influence the choice of a stress coping strategy. Turton and Campbell (2005) show that females are more likely to use a tend-and-befriend strategy than males. As reported in Panel B of Table 3, the result shows that *cooperation* is statistically significant with a *p-value* smaller than 0.01. The control variable of *gender* is not significant at the 0.10 level. This result supports H1.

5.6 Additional Analyses

My theory behind H1 suggests that ego stress causes individuals to experience the emotion of anxiety and increases their desire for cooperation. To shed light on participants' decision processes, I use a post-experiment question to assess desire for cooperation. Participants rate the extent to which they agree with the sentence, "*I have a desire to cooperate with the person to whom I was paired with,*" on a seven point scale, with 1 anchoring on "*not at all,*" and 7 anchoring on "*very much.*" The desire to cooperate is 5.26 in the HIGHEGO condition, and 3.95 in the LOWEGO condition. This difference is statistically significant with a *p-value* of 0.025 (one tailed). Table 4 presents the descriptive statistics of the *desire to cooperate* for the two conditions.

Table 4: Descriptive statistics of other variables in experiment one

Notes:

| Variable name | The HIGHEGO condition (N = 19) Mean [SDs] | The LOWEGO condition (N = 19) Mean [SDs] | T-statistics | P-value |
|------------------------------------|---|--|--------------|---------|
| Desire to cooperate | 5.26 [0.49] | 3.95[0.44] | 2.00 | 0.025* |
| Estimates of others' choices | 6.11 [0.47] | 5.37 [0.62] | 0.94 | 0.35 |
| Concerns about one's own payment | 5.42 [0.38] | 6.05 [0.25] | -1.40 | 0.17 |
| Concerns about the other's payment | 4.05 [0.39] | 4.26 [0.51] | -0.33 | 0.75 |
| Impression management | 2.26 [0.39] | 2.68 [0.47] | -0.69 | 0.50 |
| Ethical concern | 4.00 [0.43] | 3.58 [0.50] | 0.64 | 0.53 |
| Guilt avoidance | 3.16 [0.54] | 2.42 [0.40] | 1.10 | 0.28 |
| Team identity | 3.74 [0.55] | 3.79 [0.49] | -0.07 | 0.94 |
| Risk Attitude | 6.21 [0.65] | 5.74 [0.82] | 0.45 | 0.65 |

Desire to cooperate = participants' responses of the extent to which they agree with the sentence, "I have a desire to cooperate with the other participant." on a 7 point scale, where 1 = not at all and 7 = very much.

Estimates of others' choices = participants' estimates of the percentage of participants who choose to cooperate on an 11 point scale, where 1 = 0% and 11 = 100%. Participants could win another 5 cents if their guess was correct.

Concerns about one's own payment = participants' responses of the extent to which they agree with the sentence, "I wanted to maximize my own payment." on a 7 point scale, where 1 = not at all and 7 = very much.

Concerns about the other's payment = participants' responses of the extent to which they agree with the sentence, "I wanted to maximize the other participants payment." on a 7 point scale, where 1 = not at all and 7 = very much.

Impression management = participants' responses of the extent to which they agree with the sentence, "I was concerned about what the other participant think of me." on a 7 point scale, where 1 = not at all and 7 = very much.

Ethical concern = participants' responses of the extent to which they agree with the sentence, "It was unethical to choose not to contribute." on a 7 point scale, where 1 = not at all and 7 = very much.

Guilt avoidance = participants' responses of the extent to which they agree with the sentence, "I did not want to feel guilty about my choices." on a 7 point scale, where 1 = not at all and 7 = very much.

Team identity = participants' responses of the extent to which they agree with the sentence, "I considered the other participant to be my teammate." on a 7 point scale, where 1 = not at all and 7 = very much.

Risk Attitude = participants' choices in a monetary decision task, in which they were offered an extra 20 cents. They decided whether to receive the 20 cents directly, or to invest any portion of the 20 cents in a risky project, which returns 2.5 times the amount invested with 50 percent chance and 0 cents with 50 percent chance. 1 = investing 0 cents and 11 = investing 20 cents in the risky project.

An asterisk indicates a one-tailed p value for testing a directional prediction.

In a post experiment question, I elicit participants' beliefs about other people's behavior by asking them to guess the approximate percentage of participants who choose

to cooperate. Participants could win another 5 cents if their guess was correct. The average estimated cooperation rate was 51.05 percent and 43.68 percent in HIGHEGO and LOWEGO conditions, respectively. Participants' responses between the two conditions were not statistically different ($p = 0.18$, one-tailed). However, estimates of the probability of the others' choices clearly influenced participants' own choices. Participants who chose to contribute yielded a higher estimate of cooperation rate (61.67 percent) compared to those who chose not to cooperate (34.50 percent). This difference was statistically significant with a *p-value* smaller than 0.001. Overall, participants showed an adequate understanding of the task: those who were more optimistic about the cooperation rate were more willing to cooperate. The mean estimated cooperation rate, however, was not affected by stress condition. Table 4 presents the descriptive statistics of the estimates of others' choices for the two conditions.

Stress did not influence participants' estimates of cooperation rates; however, it did influence the decision to cooperate. Such observations are consistent with the theory of the motivational effect, which argues that participants are motivated to choose an option so they will feel better. This effect is independent of the perceived relation risk between two conditions. This finding is consistent with some prior studies that have examined the effect of emotion on decision-making. For example, Kugler et al. (2012) documents that the emotions of fear and anger affect decisions involving relational risks, but do not influence estimates of the probability of others' choices.

5.7 Other Randomized Factors

Various other factors such as personal preferences potentially influence cooperation. These are likely to be randomized across the two conditions due to the

random assignment of participants. To ensure that random assignment is successful and also to ensure that the manipulation does not change other potential determinants of cooperation, I elicit some of these variables in the post experimental questionnaire. These variables includes participants' concerns about their payment, concerns about the other's payment, impression management, ethical consideration, guilt aversion and team identity. None of these variables are statistically significant across different conditions. Therefore, they cannot explain the observed differences in cooperation between two conditions. Table 4 presents the descriptive statistics of these control variables for the two conditions.

Besides these variables, I also elicit participants' risk attitudes. For risk attitude, I use the Gneezy and Potters method (Gneezy and Potters 1997). Specifically, participants are offered an extra 20 cents. They may decide whether to receive the 20 cents directly, or to invest any portion of the 20 cents in a risky project, which returns 2.5 times the amount invested with 50 percent chance and 0 cents with 50 percent chance. The results show that there is no statistically significant difference between the two conditions. Therefore, risk attitude does not account for the observed differences in cooperation. Table 4 presents the descriptive statistics of risk preference for the two conditions.

CHAPTER 6

EXPERIMENT TWO

I conduct another experiment to test hypothesis 2, involving external stress, using MTurk. Experiment two is the same as experiment one, with the exception of the stress manipulation. In this experiment, I manipulate external stress in the directed-writing task in the same way as the pretest. I elicit the dependent variable of cooperation as the binary decision of whether to contribute in the Prisoners' Dilemma game. The decision task in experiment two is exactly the same as that in experiment one.

6.1 Participants

Forty participants are recruited on MTurk. The demographic information is reported in Table 3. Nineteen participants are randomly assigned to the HIGHEXTERNAL condition and 21 to the LOWEXTERNAL condition. There is no statistically significant difference in gender, age, education, or work experience between the two conditions. As in experiment one, participants receive a fixed payment of \$0.60 for participating in the study. In addition, they receive \$0.20 for completing the post-experiment questionnaire and an average bonus of \$0.49 representing decision-contingent bonuses. On average, participants spend 10 minutes on the task.

Table 5: Demographic information of experiment two

Panel A: Gender

| Gender | Proportion |
|--------|------------|
| Male | 63% |
| Female | 38% |

Panel B: Age

| Age | Proportion |
|-------|------------|
| <20 | 3% |
| 20-29 | 43% |
| 30-39 | 43% |
| 40-49 | 13% |
| >50 | 3% |

Panel C: Education

| Highest education | Proportion |
|-------------------|------------|
| High school | 3% |
| Vocational school | 43% |
| Some college | 43% |
| Bachelor's degree | 13% |
| Master's degree | 3% |

Panel D: Work experience

| Mean | Std. Dev. | Min | Max |
|-------|-----------|-----|-----|
| 11.58 | 8.14 | 0 | 32 |

6.2 Descriptive Statistics

The dependent variable of the study is the binary choice of whether participants decide to contribute to the common project. I created a variable of *cooperation*, defined as 1 if a participant decides to contribute and 0 otherwise. In the HIGHEXTERNAL condition, 6 of 19 (or 32 percent) participants chose to cooperate. In the LOWEXTERNAL condition, 13 of 21 (or 62 percent) participants chose to cooperate. These results are consistent with my expectation that the cooperation rate is lower in the HIGHEXTERNAL condition than in the LOWEXTERNAL condition. Panel A of Table 6 presents the mean of *cooperation* for the uncertain condition and the certain condition.

Table 6: Results of experiment two

Panel A: Descriptive statistics

| | The HIGHEXTERNAL condition (N = 19) | The LOWEXTERNAL condition (N = 21) |
|---------------------|---|--|
| Mean of Cooperation | 0.32 | 0.62 |

Panel B: Logistic regression analysis (Dependent variable = Cooperation)

| | Coef. | Std. Err. | z-score | p-value | [95% Confidence Interval] |
|-----------|-------|-----------|---------|---------|---------------------------|
| Stress | -1.10 | 0.69 | -1.59 | 0.06* | [-2.45, 0.26] |
| Gender | 1.10 | 0.71 | 1.54 | 0.12 | [-0.30, 2.50] |
| Intercept | -1.10 | 1.10 | 1.08 | 0.28 | [-3.27, 1.07] |

Notes:

Stress = zero for the LOWEXTERNAL condition, and one for the HIGHEXTERNAL condition.

Gender = zero for female, and one for male.

Cooperation = zero if participant choose to contribute, and one otherwise.

An asterisk indicates a one-tailed *p-value* for testing a directional prediction.

6.3 Test of H2

My second hypothesis predicts that participants are less likely to cooperate when the level of external stress is high than when it is low. To test H2, I conduct a logistic regression with *cooperation* as the dependent variable, experimental condition as the between-participant factor and gender as a control variable. As reported in Panel B of Table 6, the result shows that the variable of *stress* is marginally significant ($p = 0.06$, one tailed). The control variable of *gender* is not significant at the 0.10 level. This result provides support for H2, though not quite as strong as my findings for H1. As in experiment one, there is no statistical significant differences between two conditions in the measure of willingness to cooperate ($p = 0.23$, one tailed), estimated cooperation rate ($p = 0.55$, two tailed) and risk attitude ($p = 0.89$, two tailed). Besides these variables, I also elicit various control variables such as concerns for wealth in the same manner as

experiment one. None of the control variables are statistically different between two conditions. Table 7 presents the descriptive statistics of these variables for the uncertain condition and the certain condition.

Table 7: Descriptive statistics of other variables in experiment two

| Variable name | The HIGHEXTERNAL condition (N = 19) Mean [SDs] | The LOWEXTERNAL condition (N = 21) Mean [SDs] | T- statistics | P- value |
|------------------------------------|--|---|------------------|-------------|
| Desire to cooperate | 5.21 [0.46] | 4.71 [0.46] | 0.76 | 0.23* |
| Estimates of others' choices | 5.00 [0.37] | 4.67 [0.40] | 0.60 | 0.55 |
| Concerns about one's own payment | 5.90 [0.36] | 5.24[0.41] | 1.19 | 0.24 |
| Concerns about the other's payment | 3.79 [0.48] | 4 [0.40] | -0.34 | 0.74 |
| Impression management | 3.00 [0.45] | 2.95 [0.45] | 0.07 | 0.94 |
| Ethical concern | 3.68 [0.48] | 4.10 [0.34] | -0.71 | 0.48 |
| Guilt avoidance | 3.47 [0.53] | 2.90 [0.44] | 0.83 | 0.41 |
| Team identity | 3.89 [0.51] | 4.19 [0.49] | -0.42 | 0.68 |
| Risk Attitude | 5.52 [0.70] | 5.57 [0.73] | -0.14 | 0.89 |

Notes:

Desire to cooperate = participants' responses of the extent to which they agree with the sentence, "I have a desire to cooperate with the other participant." on a 7 point scale, where 1 = not at all and 7 = very much.

Estimates of others' choices = participants' estimates of the percentage of participants who choose to cooperate on an 11 point scale, where 1 = 0% and 11 = 100%. Participants could win another 5 cents if their guess was correct.

Concerns about one's own payment = participants' responses of the extent to which they agree with the sentence, "I wanted to maximize my own payment." on a 7 point scale, where 1 = not at all and 7 = very much.

Concerns about the other's payment = participants' responses of the extent to which they agree with the sentence, "I wanted to maximize the other participants payment." on a 7 point scale, where 1 = not at all and 7 = very much.

Impression management = participants' responses of the extent to which they agree with the sentence, "I was concerned about what the other participant think of me." on a 7 point scale, where 1 = not at all and 7 = very much.

Ethical concern = participants' responses of the extent to which they agree with the sentence, "It was unethical to choose not to contribute." on a 7 point scale, where 1 = not at all and 7 = very much.

Guilt avoidance = participants' responses of the extent to which they agree with the sentence, "I did not want to feel guilty about my choices." on a 7 point scale, where 1 = not at all and 7 = very much.

Team identity = participants' responses of the extent to which they agree with the sentence, "I considered the other participant to be my teammate." on a 7 point scale, where 1 = not at all and 7 = very much.

Risk Attitude = participants' choices in a monetary decision task, in which they were offered an extra 20 cents. They decided whether to receive the 20 cents directly, or to invest any portion of the 20 cents in a risky project, which returns 2.5 times the amount invested with 50 percent chance and 0 cents with 50 percent chance. 1 = investing 0 cents and 11 = investing 20 cents in the risky project.

An asterisk indicates a one-tailed p value for testing a directional prediction.

6.4 Interaction Analysis of Two Experiments

As is discussed above, this study predict and provide evidence that a high level of ego stress leads to higher level of cooperation than a low level ego stress. By contrast, a high level of external stress leads to lower level of cooperation than a low level of external stress. These two predictions may be viewed as an interaction, which suggests that the stress level (i.e., high and low levels) and stress type (i.e., ego and external stress types) interact to influence individuals' willingness to cooperate. Combining the data of two experiments, I provide an additional test of this interaction. In this test, I create a variable of stress type. I define that stress type equals one for two ego stress conditions in experiment one, while stress type equals zero for two external stress conditions in experiment two. I create a variable of stress level which equals one for high level stress conditions, and zero for low level stress conditions. See figure 2 for the plot of means of these four conditions. I perform ANOVA analysis of cooperation with stress type and stress level as independent variables. The results suggests that the interaction of stress level and stress type is statistically significant at 0.05 level with a p-value of 0.001. In this analysis, the main effects of stress level or stress type is not statistically significant with p-values of 0.588 and 0.954 respectively. Table 8 reports the results of ANOVA analysis of two experiments. This analysis provides additional support for the prediction that the effect of stress level on cooperation depends on the type of stress.

Figure 2: Mean plot of interaction analysis

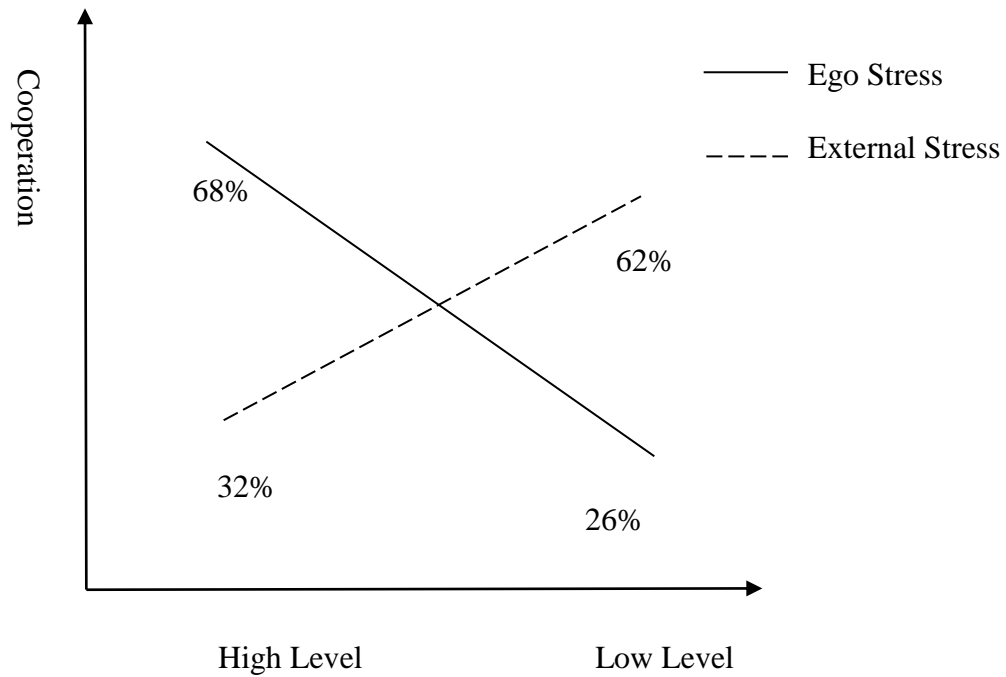


Table 8: ANOVA of two experiments

| Factor | df | Mean Square | F | p-value |
|---------------------------|----|-------------|-------|---------|
| Stress Level | 1 | 0.067 | 0.3 | 0.588 |
| Stress Type | 1 | 0.000 | 0 | 0.954 |
| Stress level× Stress Type | 1 | 2.553 | 11.21 | 0.001 |
| Error | 74 | 0.228 | | |

Notes:

Stress level equals 1 for conditions that induce a high level of ego or external stress (i.e., HIGHEGO and HIGHEXTERNAL), 0 for conditions that induce a low level of ego or external stress (i.e., LOWEGO and LOWEXTERNAL).

Stress type equals 1 for conditions that induce ego stress including both high and low level stress level (i.e., HIGHEGO and LOWEGO), 0 for conditions that induce external stress including both high and low stress level (i.e., HIGHEXTERNAL and LOWEXTERNAL).

Reported p values are two tailed.

CHAPTER VII. CONCLUSION AND DISCUSSION

In this dissertation, I investigate the influence of stress on cooperation. I argue that due to the cognitive appraisal of threat, stress activates the emotion of anxiety, which motivates individuals to develop stress coping behaviors. However, because stress differs in the secondary cognitive appraisal, the responsibility of possible failure, different types of stressors lead to different stress coping behaviors in collaborative contexts. Based on the responsibility of possible failure, I classify stressors in the workplace into two types—ego and external stressors, the former resulting from the threat of failure attributed to an individual's inability and the latter attributed to situations beyond an individual's control. I predict ego stress increases cooperation due to the enhanced need for affiliations. In contrast, external stress decreases cooperation due to the increased need to avoid threat.

I conducted two experiments with online participants to investigate the effects of different types of stress on cooperation. In both experiments, I manipulate stress using the directed writing method, in which participants write about stressful situations. Specifically, in experiment one, I operationalize high and low levels of ego stress by requiring people to describe their weaknesses and strengths respectively. In experiment two, I operationalize high and low levels of external stress by requiring participants to write about a situation that they feel most uncertain and certain respectively. Following the directed writing task, participants are paired to make monetary choices in a Prisoner's Dilemma game, which is framed as whether they choose to contribute to a joint project. The results of experiment suggest that while a high level of ego stress leads to higher

cooperation rate than a low level of ego stress, a high level external of external stress leads to lower cooperation rate than a low level of external stress.

My study contributes to the literature in four different ways. First, my study is the first to examine the effect of stress on group cooperation. The psychology literature identifies two kinds of stress coping behaviors, fight-or-flight and tend-and-befriend. The theory of fight-or-flight hints that stress may reduce cooperation due to enhanced tendency to avoid threat. The theory of tend-and-befriend predicts that stress may increase cooperation due to the increased need for affiliations. To reconcile these conflicting predictions, I create a classification scheme of stressors and provide evidence that different types of stressors have different effects on cooperation. Ego stressors, which cause individuals to worry about their capabilities, motivate an individual to seek affiliations for joint protection and increase cooperation. External stressors, which cause individuals to worry about threat related factors in the environment, motivate people to avoid risks and reduces cooperation.

Second, my study extends the management accounting literature by identifying unique motives of cooperation. While previous studies have identified many economic and social motives of cooperation, my dissertation adds to this literature by introducing the effect of emotion on cooperation. This effect is driven by neither economic strategic reasoning which involves the expectation of other people's behavior, nor social preferences such as trusting and reciprocity. This effect is unique in that it is independent of any consequential reasoning: stress influences cooperation simply because under stress engaging in certain behaviors makes decision makers feel better. Specifically, ego stress increases the need for affiliation, while external stress enhances the need for avoiding

threat. Such needs influence people's choices unconsciously. Understanding these motives helps researchers understand the antecedence of cooperation in work teams.

Third, my study points out potential influences of contextual factors and management accounting tools on cooperation. In this paper, I reviewed prior research on stressors in the workplace and discussed the relations of these stressors to management accounting practices. I further developed theories of the effects of stressors on cooperation. The theoretical framework of my paper suggests that contextual factors such as skill deficiency and uncertainty, and accounting tools such as surveillance induce stress and affect cooperation, even when these factors appear irrelevant and are independent of employees' economic incentives. My study contributes to the literature of management control in a collective work environment (Bonner and Sprinkle 2002) by identifying many personal, task and environmental variables that influence incentive mechanisms in a collaborative environment.

Fourth, the findings of this research have practical implications for the design of control systems. In a collaborative contexts, organizations trade off two sources of inefficiencies: the cost of implementing formal control and the cost of low productivity as a result of free-riding. While the results of this study helps companies evaluate the cost of low productivity as a result of free-riding, this shed light on the design of control systems. Specifically, organizations may invest in a stronger formal control system such as monitoring in situations in which the rate of free-riding is high than in situations in which the rate of free-riding is relatively low. In situations where ego stress is high and external stress is low, the rate of free-riding may be low even in the absence of a formal control system. For example, accounting teams faces difficult tasks (high ego stress) and

stable environment (low external stress), cooperation levels can be relatively high even without formal control mechanisms. In this case, it is not necessary to implement a formal control mechanism. In contrast, in situations where ego stress is low and external stress is high, the rate of free-riding may be high in the absence of a formal control system. For example, sales teams have easy tasks (low ego stress) and face turbulent market conditions (high external stress), cooperation levels may be relatively low without formal control mechanisms. In this cases, companies need to incur costs to acquire information regarding individuals' effort level and provide incentive contracts that links individual compensation to their effort to promote cooperation.

This study is subject to a few limitations. First, because stressors are classified based on people's subjective appraisals rather than objective characteristics of stressors, this study cannot prescribe classifications for all stressors without further empirical testing. Future research could focus on specific management accounting tools and contextual variables and examine their effects on cooperation. Below, I discuss two examples, including performance feedback and incentive contract.

Performance feedback is an important component of management accounting and is shown to have both learning and motivating effects (e.g. Kessler and Ashton 1981; Nelson 1993). Anticipating feedback is stressful for two reasons. First, as individuals perceive that their performance is being evaluated by their supervisors or peers, they perceive a threat to their social-image. Second, as feedback is informative of individuals' effort, skill and/or capabilities in most cases, they perceive a threat to their self-image. When individuals further perceive that they themselves are responsible for possibility of failure to receive desired feedback, feedback is an ego stressor. Feedback with different

characteristics may poses different levels of stress. First, the noisiness in performance measure reduces the informativeness of feedback on individuals' effort, skill and capabilities, and attenuates the perceived stress. For example, relative performance feedback eliminates the influence of common uncertainties in performance measures. It is expected to induce strong stress and have a strong influence on cooperation. Second, the extent to which feedback is available publicly influences the extent to which one's social image is influenced. Therefore, the extent to which feedback is publicly available influences the level of stress and its influence on cooperation. Future research could examine these hypothesis.

As another example, incentive contracting practices influence employee compensation and induce stress. A few characteristics of incentive contracts may influence stress. First, the noisiness of measures determines whether the possible failure to obtain desired payoff is attributed to oneself or to external factors. Depending on the relative salience of these characteristics, one may experience either ego or external stress. For performance-contingent contracts with noiseless performance measures, employees may worry about their own performance and impose ego stress. In contrast, stock-based compensation plans to low-level employees or incentive contracts with noisy measures, cause employees to worry about factors that are beyond their control and impose external stress. Therefore, I expect that performance-contingent contracts increase cooperation, while stock-based compensation plans decrease cooperation. Second, the stress is highly influenced by the magnitude of economic incentives and the probabilities of obtaining desired rewards. For example, performance contingent contracts, such as relative performance contracts and piece rate contracts, are more stressful than fixed wage

contracts due to economic incentives. As another example, for tournament contracts, the structure of the tournament, including the number of ranks of rewards, percentage of people who will obtain a reward in each rank, and the amount of the reward in each rank, influences the competitiveness of the tournament and impact the stress level. As a result, the effect of stress on cooperation changes accordingly.

The second limitation of the study is that the classification is influenced by individual differences. The classification is determined by the cognitive appraisals, which is a subjective judgment and is influenced by personality characteristics. That is to say, a certain situation may cause ego or external stress for individuals with different characteristics. For example, locus of control may influence the cognitive appraisal of a situation, and therefore influences the classification of stressors. In personality psychology, locus of control refers to the extent to which individuals believe that they can control events that affect them (Rotter 1966). Specifically, a person's locus of control is conceptualized as either internal or external. The former means that a person believes that they can control their life. The latter means that the person believe that their decisions and life are controlled by environmental factors, chance or fate. For a situations in which the attribution of possible failure is not very clear, individuals' locus of control may influence their cognitive appraisal of responsibility and the type of stress they experience. Future research could examine the effect of various stressors on cooperation and whether these effects are moderated by the personal characteristics of locus of control.

Another limitation of my study is that I examine settings with only one type of stressor. However, in practice, different types of stressors co-exist. The effect of multiple

stressors on cooperation may be dictated by the relative strength of different stressors. That is, individuals may react only to the most salient stressor and engage in a compensating strategy in response to that stressor. Conversely, conflicting cues creating multiple stressors may make it difficult to identify one strategy. When using one compensating strategy, it may be impossible to satisfy all sources of threats. With the absence of an optimal stress coping strategy, the anxiety will occupy limited cognitive resources and reduce attention available for the current task (for see a review, Eysenck et al. 2007). As a result, stressed individuals are expected to make more intuitive (as opposed to deliberative) decisions than non-stressed. In a collaborative environment, one's intuitive reaction is to cooperate, because people develop cooperative heuristic in the daily life, in which cooperation is generally advantageous (Rand et al. 2012). Therefore, the presence of multiple stressors may increase individual's willingness cooperative. This question may be answered in future research.

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